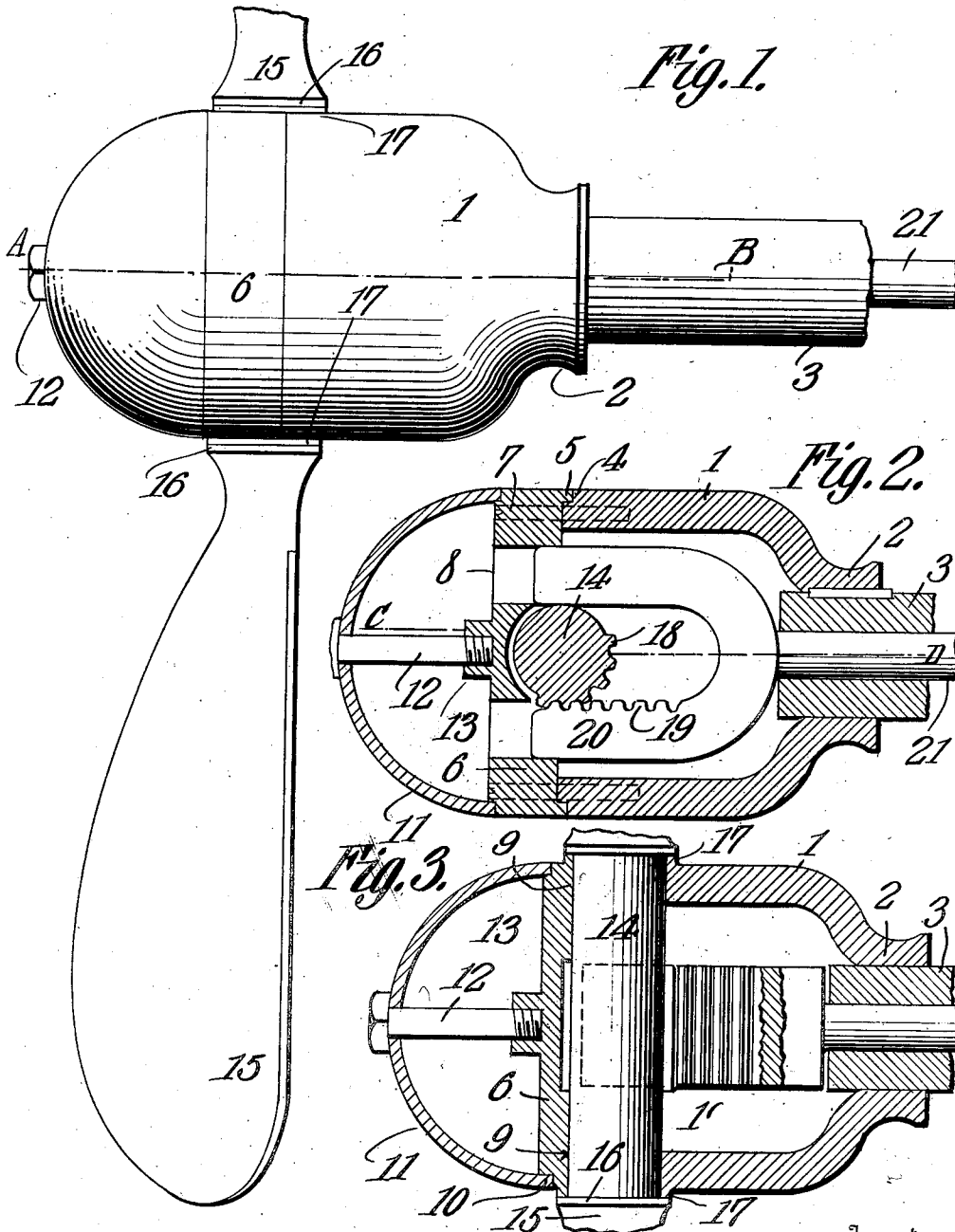


D. F. LAWRENCE.
SCREW PROPELLER.
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933,768.

Patented Sept. 14, 1909.



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Witnesses

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DANIEL F. LAWRENCE, OF BRANDON, VERMONT, ASSIGNOR OF ONE-HALF TO JUDSON H. COLE, OF BRANDON, VERMONT.

SCREW-PROPELLER.

933,768.

Specification of Letters Patent. Patented Sept. 14, 1909.

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To all whom it may concern:

Be it known that I, DANIEL F. LAWRENCE, a citizen of the United States, residing at Brandon, in the county of Rutland and State of Vermont, have invented a new and useful Screw-Propeller, of which the following is a specification.

This invention relates to speed controlling reversible screw propellers particularly designed for use in connection with motors the greatest efficiencies of which are attained when running at a predetermined substantially uniform speed.

It is very common to provide small boats and launches with motors of the internal combustion type for fishing or cruising purposes but it is difficult to readily control the speeds of the boats and their direction of movement ahead or astern. Heretofore it has been impossible to slow down a hydrocarbon engine sufficiently for fishing without danger of stopping the boat at inopportune times and while reversible propellers have been used these have all been objectionable because when brought to a predetermined position the engine almost invariably races and therefore takes in too much gasoline.

The object of the present invention is to provide a propeller which is inexpensive and durable in construction and easily controlled, and which is particularly designed for use in connection with hydrocarbon motors, the propeller being so constructed as to permit any speed from zero to the maximum to be attained in either direction.

Another object is to provide a propeller which produces a constant uniform resistance to the motor and which can be shifted to reverse the boat or vary the speed without the use of clutches or similar complicated mechanisms.

With these and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is a side elevation of a propeller embodying the present improvements, one of the blades thereof being broken away. Fig. 2 is a section on line A-B, Fig. 1. Fig. 3 is a section on line C-D, Fig. 2.

Referring to the figures by characters of

reference, 1 designates a cup-like hub section having a tubular extension 2 at one end in which is keyed or otherwise secured one end of a tubular drive shaft 3. The other end of the hub section is open and has an annular groove 4 to receive a bead 5 extending from an end plate 6 which is secured to the section 1 by means of screws 7 or in any other suitable manner, said end plate having oppositely disposed openings 8 for the purpose hereinafter set forth. The plate 6 and the adjoining end of the section 1 have registering recesses 9 forming openings for the purpose hereinafter set forth and an annular groove 10 is formed in the outer face of plate 6 at the periphery thereof and is designed to receive the edge of a substantially semi-spherical cap 11. This cap is secured to the plate 6 in any preferred manner as by means of a screw 12 extending through the center thereof and engaging a boss 13 formed upon the center of the plate 6.

Journated within the openings 9 is a shaft 14 having a propeller blade 15 at each end thereof, the two blades being oppositely inclined to the axis of the shaft 3 when viewed from one side of said shaft and each blade having an annular shoulder 16 at its inner end designed to bear against a boss 17 outstanding from the hub section 1. A segmental gear 18 is formed upon the middle portion of the shaft 14 and engages teeth 19 formed upon the inner face of one arm of a fork 20, said arm constituting a rack. This fork is formed at one end of an actuating rod 21 extending through the shaft 3 and the ends of the fork are slidably mounted within the openings 8 heretofore referred to. Gear 18 and teeth 19 are so located and proportioned that one complete movement of the fork in either direction will produce a practically one quarter rotation of shaft 14 and the blades connected to it.

It is of course to be understood that the shaft 3 may be rotated by a motor in any preferred manner and will cause a corresponding rotation of all parts of the hub and of the shaft 14, fork 20, and rod 21. By shifting the rod 21 longitudinally the fork 20 can be shifted relatively to shaft 14 and said shaft caused to partly rotate so as to bring the blades 15 to any desired pitch so that the boat to which the propeller is attached can be driven forward at any desired speed or can be reversed and propelled at a

desired speed. The adjustment of the blades may be rendered very minute by means of the mechanism described.

It will be noted that all of the working parts are completely housed within the hub and can not get out of order or become clogged with dirt, etc. Access can be quickly had to the parts within the hub simply by removing the bolt or screw 12 and detaching the plate 6. The propeller shaft 14 can then be lifted out of the section 1 and the fork 20 and rod 21 withdrawn, if desired. It will be apparent therefore that should any of the parts break new ones may be readily substituted therefor without requiring the services of an experienced mechanic.

It is of course to be understood that various changes may be made in the construction and arrangement of the parts without departing from the spirit of the present invention.

What is claimed is:

1. In a propeller a hub comprising a cup-like section, a plate detachably secured to the open end of said section, said plate and section having registering recesses for the reception of a shaft extending entirely through the hub, a cap bearing upon the marginal portion of the plate and constituting an end closure for the hub, and means

detachably engaging the middle portions of the cap and plate for holding said cap in position.

2. In a propeller a hub comprising a cup-like section, a member detachably secured to the open end of said section, said member and section having registering recesses, a cap bearing upon the marginal portion of the detachable member and constituting an end closure for the hub, means detachably engaging the middle portions of the cap and member for holding the cap in position, a shaft extending entirely through the hub and bearing within the registering recesses within the detachable member and the section, a propeller blade at each end of and movable with the shaft, said blades being oppositely inclined to the axis of the shaft when viewed from one side of the hub, a gear upon the shaft and within the hub, a rack slidably mounted within the hub and engaging the gear, and an actuating member extending from the rack and beyond the hub.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

DANIEL F. LAWRENCE.

Witnesses:

O. H. MOREHOUSE,
LUCIA F. THOMAS.